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Common Smuts and Their Treatment

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Smuts are causing considerable damage to crops in Oklahoma every year. Corn, wheat, oats, barley and the sorghum crops are affected by these fungus diseases. The amount of damage done to these crops in reducing the yields runs from one to as high as seven or eight per cent. In some fields as much as twelve per cent of the crop has been found to be damaged by smuts. Furthermore, these fungus diseases are spreading generally over the whole state and unless proper treatment is given the seed and special care taken to grow crops free from the disease, the problem of eliminating the smuts will become greater as the damage increases.

The following instructions are recommended in handling and treating the several crops for smuts:

Corn—There is no treatment of the seed that will eliminate smut from corn. The amount of damage can be greatly reduced and practically eliminated by going through the fields and removing the plants or parts of the plants affected. This should be done early, before any of the smut masses become dry or ripe. This material should be burned immediately; if not, the spores may ripen even after they are removed from the plant and will infect the soil. Since the spores may live over in the soil from one year to another the rotating of crops also helps to eliminate this disease.

Sorghums—There are two kinds of sorghum smut, the head smut and the kernel smut. The head smut of sorghums should be handled in the same way as corn smut. The distinguishing characteristic between head and kernel smut is that the former destroys practically the whole head so that there is little semblance of that part of the plant as the smut mass emerges from the boot.

The kernel smuts of sorghums are much more common than the head smut. As the head of the sorghum plant comes out of the boot it looks almost normal but on close examination and later as the plant matures it will be found that the chaff or glumes enclose a small smut mass instead of the seed. On harvesting or threshing the grain the smut spores when ripe lodge on the outside of the healthy grain. When this seed is planted the next year the smut spores germinate and infect the seedling plant. As the plant matures and heads out, the smut balls again appear in place of the seed, thus completing its life cycle. To kill the spores on the outside of the kernel, the formalin treatment will suffice and as it is rather simple it is recommended.

THE FORMALDEHYDE TREATMENT

Solution—Use one pint or pound of formaldehyde (formalin) to 35 or 40 gallons of water. Place the seed to be treated in a sack and immerse in the solution for ten minutes. Place the seed on a clean floor, covering for an hour or two with bags wet with the solution, after which spread the seed out to dry.

In place of dipping the seed in the solution, it may be sprinkled. By the use of an ordinary sprinkling can the solution may be sprinkled on the grain as it is shoveled over. Make sure that the kernels are thoroughly wet. As the solution is not expensive this is a convenient method.

Oats—Oat smut can be successfully treated with the formalin solution as in the case of the kernel smut of sorghum.

Wheat—There are two smuts of wheat, namely, the loose smut and the stinking smut or bunt. The latter is much more common in Oklahoma and is readily distinguished from the former. When wheat is affected by the loose smut the whole

head becomes black immediately after heading. With stinking smut the head is apparently normal but on threshing or rubbing the head, smut balls instead of wheat grains will be found. The treatment for stinking smut of wheat is the same as in the case of the kernel smut of sorghums, the formalin method.

THE HOT WATER TREATMENT FOR LOOSE SMUT

At least two tubs, hot water and an accurate thermometer are necessary. The grain (about one-half bushel or less) is placed in a sack (a gunny sack or sack of loosely woven material). The sack with the grain is then immersed in waetr, the temperature of which should be about 70 degrees Fahrenheit. After soaking for three or four hours (if water is cold, soak four to six hours) the sack containing the grain should be placed in one of the tubs of water the temperature of which should be about 105 or 110 degrees Fahrenheit. It should be left in this tub only a minute. or two, moving the sack up and down once or twice so as to have the water of uniform temperature. It is then placed in the other tub containing water at 129 degrees Fahrenheit and left for ten minutes.

The grain should then be removed and dipped in cold water to bring the temperature down. It is very necessary that the water in the second tub should not be warmer than 131 degrees Fahrenheit and not colder than 124 degrees Fahrenheit. Experiments have shown that if the water is hotter, then the grain will be killed and will not germinate. If the water is cooler the smut spores will not be killed. Therefore, the necessity of an accurate thermometer and the following of the directions carefully. After this treatment the seed should be spread out where it can dry. When sown after treatment allowance should be made for a thicker rate as some of the seeds may be killed by the treatment and too the seeds are larger, having been soaked in water.

Barley—There are two smuts of barley, the covered smut and the loose smut. The former is treated with formalin as in the case of wheat. For the loose smut of barley the hot water method is necessary. The temperature should be 126 degrees Fahrenheit (not higher than 129 degrees Fahrenheit nor lower than 124 degrees Fahrenheit) and the grain dipped for thirteen minutes.

Before treating grain with formalin the seed should be run through a fanning mill to blow out and remove the smut ball,, dirt and chaff. It is sometimes possible to remove smut balls from the seed if the grain is not put in a sack when treated, but is simply poured loose into the tub containing the solution. By stirring the grain in the tub the smut balls come to the surface and can be skimmed off.

After treating grain by the hot water method or with the formalin solution it should be tested for germination and the rate of seeding governed accordingly. Allowance should also be made for the swelling of seeds due to soaking in giving either treatment.

Because of the fact that the treatment of seed by the hot-water method is a rather slow and tedious task, it would not be an easy matter to treat a large quantity of seed, sufficient to sow 50 or 100 acres. In such cases it would be well to treat enough seed to sow five or ten acres as a seed plot and see that the grain from this small field is threshed separately and kept for seed.

After grain has been treated with formalin the bins, sacks, seeder or any other material with which the seed comes in contact should be washed or treated with the solution to kill any smut spores that may be adhering to them and with which the seed may again become infected.

Formalin is relatively cheap and can be obtained at drug stores.

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